इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 8891 (1978): Pine Tar for Rubber Industry [PCD 13: Rubber and Rubber Products]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN
IGNORANTIA JURIS NON EXCUSAT
PROTECTED BY COPYRIGHT

IS : 8891 - 1978

(Reaffirmed 2012)

Indian Standard

SPECIFICATION FOR PINE TAR FOR RUBBER INDUSTRY

(First Reprint APRIL 1997)

UDC 668.476 : 678.4.049

© *Copyright* 1980

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 4

March 1980

Indian Standard
SPECIFICATION FOR PINE TAR FOR RUBBER INDUSTRY

Rubber Products Sectional Committee, PCDC 13

Chairman	*Representing*
Dr D. Banerjee	Escon Consultants Pvt Ltd, Calcutta
Members	
Shri M. L. Bahrani	Ministry of Defence (R&D)
Shri Anil Agarwal (*Alternate*)	
Shri A. K. Bandyopadhya	Ministry of Defence (DGI)
Shri M. Kumaran (*Alternate*)	
Shri A. T. Basak	Directorate General of Supplies & Disposals, New Delhi
Shri S. K. Bose	National Test House, Calcutta
Shri A. Ghosh (*Alternate*)	
Dr S. N. Chakravarty	Bayer (India) Ltd, Bombay
Shri R. R. Pandit (*Alternate*)	
Shri D. K. Chatterjee	Alkali & Chemical Corporation of India Ltd, Rishra
Dr S. K. Ray (*Alternate*)	
Shri O. P. Dhamija	Export Inspection Council of India, Calcutta
Shri P. K. Chatterjee (*Alternate*)	
Shri K. N. Ganesh	Indian Petrochemicals Corporation Ltd, Jawaharnagar
Shri S. B. Ganguli	Dunlop India Ltd, Calcutta
Shri P. N. S. Myer (*Alternate*)	
Shri A. George John	Madras Rubber Factory Ltd, Madras
Shri K. J. Abraham (*Alternate*)	
Shri Lalit Mohan Jamnadas	Cosmos India Rubber Works Pvt Ltd, Bombay
Shri Pulin L. Kinariwala (*Alternate*)	
Shri R. C. Jhingan	Indian Oil Corporation Ltd, Bombay
Shri M. K. Jain (*Alternate*)	
Dr I. V. Krishnamurti	National Rubber Manufacturers' Ltd, Calcutta
Shri J. Chatterjee (*Alternate*)	
Shri S. V. Lathia	Lathia Rubber Manufacturing Co Pvt Ltd, Bombay
Shri D. P. Lathia (*Alternate*)	
Shri V. N. Maker	All India Rubber Industries Association, Bombay
Shri M. M. Patel (*Alternate*)	
Dr S. P. Manik	Railway Board, Ministry of Railways
Shri D. N. V. Chellam (*Alternate*)	

(*Continued on page* 2)

© *Copyright* 1980
BUREAU OF INDIAN STANDARDS
This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(*Continued from page* 1)

Members	*Representing*
Dr W. Milins	Indian Rubber Manufacturers' Research Association, Bombay
Shri N. Nagarajan	Sundaram Industries Pvt Ltd, Madras
Shri P. Vijayaraghavan (*Alternate*)	
Dr C. K. N. Nair	Rubber Board, Kottayam
Shri S. C. Nandy	Bata India Ltd, Calcutta
Shri Sunil Sarkar (*Alternate*)	
Dr N. V. C. Rao	Directorate General of Technical Development, New Delhi
Shri G. R. Inamdar (*Alternate*)	
Shri M. S. Saxena, Director (P & C)	Director General, ISI (*Ex-officio Member*)

Secretary

Shri Satish Chander
Deputy Director (P & C), ISI

Rubber Chemicals and Compounding Ingredients Subcommittee, PCDC 13 : 5

Convener	
Shri A. K. Sen Chaudhuri	Escon Consultants Pvt Ltd, Calcutta

Members	
Dr M. C. Badrinarayana	Bayer (India) Ltd, Bombay
Dr S. N. Chakravarty (*Alternate*)	
Shri A. K. Bandyopadhya	Ministry of Defence (DGI)
Shri P. L. Nag (*Alternate*)	
Shri B. Banerjee	Indian Rubber Manufacturers' Research Association, Bombay
Shri B. Bhattacharya	Inchek Tyres Ltd, Calcutta
Shri P. K. Sarkar (*Alternate*)	
Shri S. K. Bose	National Test House, Calcutta
Dr D. K. Das (*Alternate*)	
Shri D. K. Chatterjee	Alkali & Chemical Corporation of India Ltd, Rishra
Dr S. K. Ray (*Alternate*)	
Shri J. Chatterjee	National Rubber Manufacturers' Ltd, Calcutta
Shri A. K. Biswas (*Alternate*)	
Shri R. W. Dharwadkar	United Carbon India Ltd, Bombay
Shri S. B. Ganguli	Dunlop India Ltd, Calcutta
Shri A. Sen (*Alternate*)	
Dr A. S. Ghag	All India Rubber Industries Association, Bombay; *and* Mindia Chemicals Ltd, Bombay
Shri S. V. Lathia (*Alternate*)	All India Rubber Industries Association, Bombay
Shri H. B. Kingsley (*Alternate*)	Mindia Chemicals Ltd, Bombay
Shri J. N. Ghosal	Sturdia Chemicals Ltd, Bombay
Shri H. S. Vijayanath (*Alternate*)	
Shri C. S. Inamdar	Cosmos India Rubber Works Pvt Ltd, Bombay
Shri Sen Gupta (*Alternate*)	

(*Continued on page* 14)

Indian Standard
SPECIFICATION FOR PINE TAR FOR RUBBER INDUSTRY

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 10 July 1978, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 Pine tar is the pitch left after distilling off the volatiles from the material obtained by the destructive distillation of pine wood stumps, or blended and processed residue from terpene distillation. It is a complex mixture of terpene hydrocarbons, resin acids from rosin, complex phenols and polymerised terpenes.

0.3 Pine tar is a tackifier, softener and plasticizer for natural as well as synthetic rubbers.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for pine tar for rubber industry.

2. GRADES

2.1 Pine tar shall be of two grades namely, Grade 1 and Grade 2, depending upon its viscosity and acid number as indicated in Table 1.

3. REQUIREMENTS

3.1 The material shall comply with the requirements given in Table 1.

4. PACKING AND MARKING

4.1 Packing — The material shall be packed in mild steel containers or as agreed to between the purchaser and the supplier.

---

*Rules for rounding off numerical values (*revised*).

TABLE 1 REQUIREMENTS FOR PINE TAR FOR RUBBER INDUSTRY

(*Clauses* 2.1 *and* 3.1)

SL No.	CHARACTERISTIC	REQUIREMENT FOR		METHOD OF TEST, REF TO
		Grade 1	Grade 2	
(1)	(2)	(3)	(4)	(5)
i)	Colour	Dark brown	Dark brown	Visual
ii)	Relative density at 27°/27°C, *Min*	0·99±0·03	0·99±0·03	IS : 1448 (P : 16)-1967*
iii)	Distillation range, °C:			IS : 1448 (P : 18)-1967†
	a) Initial boiling point, *Min*	150	150	
	b) 10 percent, *Min*	200	200	
	c) 80 percent, *Max*	360	360	
iv)	Flash point, °C, *Min*	80	80	IS : 1448 (P : 69)-1969‡
v)	Viscosity in seconds at 38°C:			Appendix A
	a) Redwood No. 1	1 100 to 1 600	—	
	b) Redwood No. 2	—	130 to 250	
vi)	Solubility in equal volume of ethyl alcohol	Complete	Complete	Appendix B
vii)	Acid number	35 to 50	45 to 70	Appendix C
viii)	Non-acid constituent, percent by mass	50 to 60	50 to 60	Appendix D
ix)	Steam volatile acids (as acetic acid), percent by mass, *Max*	1	1	Appendix E
x)	Ash content, percent by mass, *Max*	0·5	0·5	IS : 1448 (P : 4)-1968§
xi)	Moisture content, percent by mass, *Max*	0·5	0·5	7 of IS : 7086 (Part I)-1973‖
xii)	Manganese content, ppm, *Max*	15	15	11 of IS : 7086 (Part I)-1973‖
xiii)	Copper content, ppm, *Max*	15	15	12 of IS : 7086 (Part I)-1973‖

*Methods of test for petroleum and its products: P 16 Density by hydrometer method.

†Methods of test for petroleum and its products: P 18 Distillation.

‡Methods of test for petroleum and its products: P 69 Flash and fire-point by Cleveland (open) cup method.

§Methods of test for petroleum and its products: P 4 Ash, sulphated ash and water soluble ash.

Methods of sampling and test for rubber compounding ingredients, Part I.

4.2 Marking — The containers shall be marked with the following:

a) Manufacturer's name or recognized trade-mark,
b) Grade of the material,
c) Net mass of the material, and
d) Lot or batch number.

4.3 BIS Certification Marking

The product may also be marked with Standard Mark.

4.3.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

APPENDIX A

[*Table* 1, *Item* (v)]

MEASUREMENT OF VISCOSITY

A-1. REDWOOD VISCOMETER NO. 1

A-1.0 General

A-1.0.1 This apparatus is used for determining the viscosity of an oil expressed as a time of flow in seconds through a specified hole made in an agate piece. The Redwood apparatus measures viscosity in empirical units and not in absolute units such as centistokes. The method is primarily applicable for viscosity determination of oil which flows in a Newtonian manner, that is, if it possesses a linear relationship between shearing stress and rate of shear under the test condition.

A-1.0.2 The apparatus will correctly indicate the viscosity flow time if it stands between 30 seconds and 2 000 seconds. If the flow time measured with this apparatus for any oil exceeds 2 000 seconds, the test should be repeated with Redwood Viscometer No. 2 which will give the correct value of viscosity for such highly viscous liquids.

A-1.1 Apparatus — The apparatus consists of the following:

a) Silver-plated brass cup with agate piece at the bottom having a hole of size 1·620 mm and a pin fitted on the rim for taking the support for cup thermometer (*see* Fig. 1). An indicator for oil level is also provided.

b) Silver-plated cover for the above, fitted with insulated handle and a suitable slot for oil cup thermometer and valve.

c) Copper bath, brightly polished inside and hammer painted outside and provided with a circular band heater, cord and electrical fittings, and drain-out stop cock.

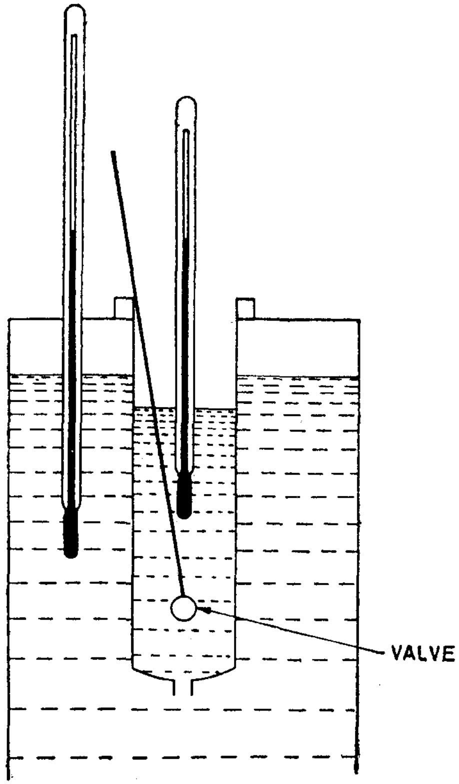

FIG. 1 REDWOOD VISCOMETER

d) Bright nickel plated stirring mechanism with four vanes, a socket for bath thermometer, and two insulated handles for manual stirring.

e) Thermometer support for cup thermometer. This will be mounted on item (a).

f) Valve for stopping or starting the flow. This consists of a silver plated ball fixed at the end of a wire.

g) Screen or shield made of cast aluminium with three levelling screws. It is painted white inside. The entire apparatus rests on the screen. The purpose of the screen is to prevent cooling of lower side of the apparatus by draughts, when the tests are conducted at a higher temperature.

h) Two thermometers of each range for the cup and for the bath as given below:

Range	0 to 44°C
Graduation	0·2°C
Range	37·8 to 82°C
Graduation	0·2°C
Range	76·0 to 122°C
Graduation	0·2°C

j) Circular spirit level.

k) Rheostat, 360 watts, for controlling the rate of heating.

m) Glass flask receiver, capacity $50 \pm 0{\cdot}06$ ml at 20°C.

n) Teak wood case.

A-1.2 Sampling

A-1.2.1 Homogenize the sample by stirring, shaking or rolling and decant while it is still hot for treatment stated in **A-1.2.2**.

A-1.2.2 For determinations at temperatures of 93·3°C or lower, heat 200 ml of the sample, without stirring, in a loosely stoppered container filled as completely as possible, for 1 hour at 100°C by immersion in a suitable liquid bath maintained at that temperature, for example in boiling water bath. Then adjust the temperature of the sample by immersion in a liquid bath the temperature of which is slightly below the test temperature. Carry out subsequent heating by using a source of heat not higher than 121°C and in no circumstances heat the sample over a flame before pouring it into the oil cup, nor adjust the temperature of the sample in the oil cup by immersing hot bodies in it. Determine the viscosity within one hour of the sample reaching the desired temperature.

A-1.3 Procedure

A-1.3.1 *Setting Up the Apparatus* — Clean the oil cup with a suitable solvent for example, carbon tetrachloride and then dry it thoroughly using soft tissue paper, or some similar material which will not leave any fluff. Set up the viscometer, using the circular spirit level, to ensure that it is level. Fill the bath with water.

A-1.3.2 Heat the viscometer bath to a few degrees above the desired test temperature. Pour the prepared sample into the oil cup through a filter of metal gauze not coarser than 150 microns IS Sieve. Adjust the temperature of the bath until the sample in the cup is maintained at the test temperature, stirring the contents of the bath and cup during this process, preferably using continuous stirring for the bath. Stir the sample during the preliminary period closing the bottom of the jet by suitable means, but do not stir the sample during the actual determination. When the temperature of the sample has become quite steady at the desired value, adjust the liquid level by allowing the sample to flow out until the surface of the sample touches the filling point. Place the oil cup, and swing the oil cup thermometer towards the closed end of the curved slot in the cover. Place the clean, dry, standard 50 ml flask centrally below the jet, with the top of the neck a few millimetres from the bottom of the jet. Do not insulate the flask in any way. Lift the ball valve and simultaneously start the time recorder. Suspend the valve from the clip supporting the oil cup thermometer by means of the hook in the wire stem. Stop the time recorder the moment the sample reaches the graduation mark of the flask and note the final reading of the oil cup thermometer.

A-1.3.3 Reject any determination if the temperature of the sample in the oil cup varies during the run by more than 0·1°C.

A-1.4 Calculation and Reporting — Report the time in seconds to the nearest 0·5 for values below 200 seconds, and to the nearest whole second for values above 200 seconds, as the Redwood Viscosity, stating which viscometer was used and the test temperature.

NOTE — If the viscometer is intended to do very precise measurements, or if it is to be used for referee work, it can be provided, if so desired by the user, with a certificate from National Physical Laboratory, New Delhi. The correction factor, if any, suggested by NPL can be taken into account in expressing the final result of test.

A-1.5 Precision — For determination with NPL certified instruments, at lower temperatures, results of duplicate tests should not differ by more than the following amounts:

Redwood No. 1 Viscosity, Seconds	*Repeatability*	*Reproducibility*
100 or less	1 second	2 seconds
Greater than 100	1 percent of mean	2 percent of mean

A-2. REDWOOD VISCOMETER NO. 2

A-2.0 This instrument is used for measuring viscosity of highly viscous liquids the flow time for which is more than 2 000 seconds on Redwood viscometer No. 1.

A-2.0.1 The viscometer is available in two models, gas heating and electrical heating. Both the instruments are same except in case of electrical heating model the heating tube is replaced by an electrical heating element. In the case of electrical heating model a dimmerstat is supplied for the regulation of temperature. All the spares for gas heating model can be used for the electrical heating one also. This viscometer can be used up to 260°C.

A-2.1 Apparatus

A-2.1.1 The Redwood viscometer No. 2 consists of a cylindrical vessel the base of which is prolonged as a tube into which a jet is fixed with its bore in the axis of the cup and its bottom surface entirely below the adjacent metal of the tube. The bottom of the cup is concave internally, to allow complete drainage of the liquid with which it is to be filled. The upper end of the cup is open, and has a plane rim. A wire turned upwards at right angles and tapered to a sharp point for the precise level for the oil surface is fixed into the side of the oil-cup. The oil-cup is heavily silver-plated to reduce corrosion. A screw connection is provided by means of which the tube is firmly attached to the bottom of the heating bath. The oil-cup is held securely in position. Bath for heating liquid is chromium plated and is provided with a tap for drainage and two side-tubes for heating the contents. These tubes are brazed to opposite sides of the bath.

A-2.1.2 In the electrically heated model an immersion heater is fitted to the side of the bath which is connected to the mains through a dimmerstat auto-transformer for temperature control. The bath is mounted on a stand with levelling feet. The 350 ml collecting flask can be mounted on the base of the stand. Stirring of the bath is effected by means of a cylinder, surrounding the oil-cup, provided with vanes the upper and lower portions of which are turned in opposite directions. A curved shield is fixed to the upper edge of the cylinder. This provides both a means of attachment for an insulated handle for rotating the stirrer and a support for the bath thermometer. The cylinder supporting the vanes is cut away between the points of attachment of the vanes to facilitate transference of the heat from the liquid in the bath to the oil-cup.

A valve for starting and stopping the flow of the liquid from the oil-cup consists of a metal ball carried on a stiff wire, both wire and ball being heavily silver-plated. The upper end of the wire is bent to provide a hook by means of which the valve may be hung on the thermometer support so that there is no interference with the flow of the oil through the jet. A thermometer support is provided to support the oil-cup thermometer. This clip is carried on a vertical stand and fixed to the upper edge of the oil-cup diametrically opposite the filling point. The oil-cup is fitted with an insulated handle and has suitable slots for oil-cup thermometer and valve-wire. A circular level is mounted on a plate and it fits the upper end of the oil-cup. Each instrument carries a works certificate for the correction factor.

A-2.2 Sampling — Same as for Redwood viscometer No. 1 and given in **A-1.2**.

A-2.3 Procedure

A-2.3.1 *Setting Up the Apparatus* — Clean the oil-cup with a suitable solvent, for example, carbon tetrachloride, and then dry it thoroughly, preferably by blowing hot air or using soft tissue paper or some similar material which will not leave any fluff. Mount the spirit level on top of the cup and level the instrument. Fill the bath with water. Clean the collecting flask with a suitable solvent, such as the one used for cleaning the oil-cup. Adjust the dimmerstat setting for attaining and maintaining the required bath temperature.

A-2.3.2 Heat the viscometer bath to a few degrees above the desired test temperature. Pour the prepared sample into the oil-cup through a filter of metal gauze not coarser than 150 micron IS Sieve. Adjust the temperature of the bath until the sample in the cup is maintained at the test temperature, stirring the contents of the bath and cup during this process, preferably using continuous stirring of the bath. Stir the sample during the preliminary period, for example by means of the ball-valve, closing the bottom of the jet by suitable means, but do not stir the sample during the actual determination. When the temperature of the sample has become quite steady at the desired value, adjust the liquid level by allowing the sample to flow out until the surface of the sample touches the filling point. Place the oil-cup cover, which shall be slightly warmed, and swing the oil-cup thermometer towards the closed end of the curved slot in the cover. Place the clean, dry, standard 50 ml flask centrally below the jet with the top of the neck a few millimetres from the bottom of the jet. Do not insulate the flask in any way. Lift the ball-valve and simultaneously start a time recorder. Suspend the valve from the clip supporting the oil-cup thermometer by means of the hook in the wire stem. Stop the time recorder at the moment the sample reaches the graduation mark of the flask and note the final reading of the oil-cup thermometer.

A-2.3.3 Reject any determination if the temperature of the sample in the oil-cup varies during the run by more than 0·1°C.

APPENDIX B

[*Table* 1, *Item* (vi)]

SOLUBILITY OF PINE TAR

B-1. APPARATUS

B-1.1 Test Tubes with Corks

B-2. REAGENTS

B-2.1 Ethyl Alcohol — rectified or denatured.

B-3. PROCEDURE

B-3.1 Measure about 5 ml of pine tar in a test tube. Add 5 ml of ethyl alcohol, stopper with a cork and shake vigorously intermittently for 5 minutes. Allow to stand for 5 minutes, then re-shake for 5 minutes. Examine visually for insoluble or immiscible liquid layers, heavier or lighter than the solvent.

APPENDIX C

[*Table* 1, *Item* (vii)]

DETERMINATION OF ACID NUMBER

C-0. DEFINITION

C-0.1 Acid Number — It is numerically equivalent to the number of milligrams of potassium hydroxide required to neutralize the free acids present in one gram of the material (pine tar) under the prescribed conditions of test.

C-1. REAGENTS

C-1.1 Ethyl Alcohol — 95 percent by volume, or rectified spirit. To remove impurities which might get coloured by potassium hydroxide solution and interfere with the sharpness of the end point, reflux the 95 percent alcohol or rectified spirit over solid sodium hydroxide for 6 to 8 hours, and then distill.

C-1.2 Phenolphthalein Indicator — Dissolve 0·1 g of phenolphthalein in 100 ml of 60 percent rectified spirit.

C-1.3 Potassium Hydroxide Solution — 0·1 N, standardized before used.

C-2. PROCEDURE

C-2.1 Weigh accurately about 2·5 g of the dried pine tar and dissolve in 50 ml of rectified spirit previously neutralized to phenolphthalein indicator with potassium hydroxide solution. Add about 10 drops of phenolphthalein indicator and titrate with potassium hydroxide solution until the solution remains faintly pink after 10 seconds of shaking.

C-3. CALCULATION

C-3.1 Calculate acid value of the pine tar by the following formula :

$$\text{Acid value} = \frac{56{\cdot}1 \times V \times N}{M}$$

where

V = volume in ml of potassium hydroxide solution consumed,
N = normality of potassium hydroxide solution, and
M = mass in g of the pine tar taken.

APPENDIX D

[*Table* 1, *Item* (viii)]

DETERMINATION OF NON-ACID CONSTITUENTS

D-1. APPARATUS

D-1.1 Separating Funnel — 250 ml.

D-1.2 Weighing Bottle — Tall form.

D-1.3 Distillation Flask — 150 ml.

D-2. REAGENTS

D-2.1 Ether

D-2.2 Sodium Hydroxide Solution — 2 N (approximately). Dissolve 8 g of sodium hydroxide in 100 ml water.

D-3. PROCEDURE

D-3.1 Weigh about 5 g of the sample accurate to 0·001 g into a 250 ml separating funnel. Add 100 ml of ether, shake to dissolve the tar and then add 25 ml of sodium hydroxide solution. Shake thoroughly, allow to separate and run off to waste the lower sodium hydroxide layer. Add 50 ml of distilled water to the retained ether solution, shake thoroughly and allow to separate. Run off the aqueous layer, add a further 325 ml of ether to the ether extract in the separating funnel and wash well with two further portions of 20 ml of distilled water, taking care to obtain the exact separation of the water and ether. (The last water extract should be quite colourless and shall be neutral when tested with phenolphthalein indicator.) Run the ether extract into a weighed distillation flask. Distill off the ether, taking normal usual precautions. Remove the last traces of water by the addition of about 4 ml of acetone and carefully evaporate. Dry the extract in an oven at 70±2°C for 2 hours, cool in a desiccator and reweigh the flask.

D-4. CALCULATION

$$\text{Non-acid constituents, percent by mass} = \frac{B-A}{C} \times 100$$

where

A = mass in g of empty flask,
B = mass in g of flask with extract, and
C = mass in g of sample.

APPENDIX E

[*Table* 1, *Item* (ix)]

DETERMINATION OF STEM VOLATILE ACIDS

E-1. APPARATUS

E-1.1 Kjeldahl Flask — 300 ml.

E-1.2 Steam Generator

E-1.3 Condenser

E-1.4 Conical Flask — 1 litre.

E-2. REAGENTS

E-2.1 Sodium Hydroxide Solution — 0·1 N.

E-2.2 Phenolphthalein Indicator

E-3. PROCEDURE

E-3.1 Counterbalance a 300 ml Kjeldahl flask on a large balance. Carefully pour in approximately 100 g of sample and weigh. Connect the flask to a steam generator and condenser. Steam distill for $1\frac{1}{2}$ hours and collect the distillate in conical flask. Add phenolphthalein to the distillate and titrate with sodium hydroxide solution.

E-4. CALCULATION

$$\text{Steam volatile acid (calculated as acetic acid, percent by mass)} = \frac{6\,V\,N}{M}$$

where

V = volume in ml of sodium hydroxide solution required,
N = normality of sodium hydroxide solution, and
M = mass in g of the sample.

(Continued from page 2)

Members	*Representing*
Shri S. M. Mehta	Camphor & Allied Products Ltd, Bareilly
Shri S. N. Mehra (*Alternate*)	
Shri S. C. Nandy	Bata India Ltd, Calcutta
Shri S. Sarkar (*Alternate*)	
Dr V. S. Vijayan Nayar	Travancore Titanium Products Ltd, Trivandrum
Shri M. M. Patel	Synthetics and Chemicals Ltd, Bombay
Shri R. P. Dubey (*Alternate*)	
Shri V. D. Pendse	Swastik Rubber Products Ltd, Pune
Shri S. V. Tathawadkar (*Alternate*)	
Shri P. S. Pratap	I.A. & I.C. Pvt Ltd, Bombay
Shri C. N. Vyas (*Alternate*)	
Shri R. Roy Chowdhury	Philips Carbon Black Ltd, Calcutta
Dr S. M. Shetty	Canara Rubber Products Pvt Ltd, Mangalore
Shri D. V. Wittenbaker	Waldies Limited, Calcutta
Shri A. Deb (*Alternate*)	

BUREAU OF INDIAN STANDARDS

***Headquarters*:**
Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 323 0131, 323 3375, 323 9402
Fax : 91 11 3234062, 91 11 3239399, 91 11 3239382

Telegrams : Manaksanstha
(Common to all Offices)

***Central Laboratory*:**	Telephone
Plot No. 20/9, Site IV, Sahibabad Industrial Area, Sahibabad 201010	8-77 00 32
Regional Offices:	
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	323 76 17
*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	337 86 62
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113	235 23 15
†Western : Manakalaya, E9, Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093	832 92 95
Branch Offices::	
'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001	550 13 48
‡Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058	839 49 55
Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003	55 40 21
Plot No. 62-63, Unit VI, Ganga Nagar, BHUBANESHWAR 751001	40 36 27
Kalaikathir Buildings, 670 Avinashi Road, COIMBATORE 641037	21 01 41
Plot No. 43, Sector 16 A, Mathura Road, FARIDABAD 121001	8-28 88 01
Savitri Complex, 116 G.T. Road, GHAZIABAD 201001	8-71 19 96
53/5 Ward No.29, R.G. Barua Road, 5th By-lane, GUWAHATI 781003	54 11 37
5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001	20 10 83
E-52, Chitaranjan Marg, C-Scheme, JAIPUR 302001	37 29 25
117/418 B, Sarvodaya Nagar, KANPUR 208005	21 68 76
Seth Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001	23 89 23
NIT BUilding, Second Floor, Gokulpat Market, NAGPUR 440010	52 51 71
Patliputra Industrial Estate, PATNA 800013	26 23 05
Institution of Engineers (India) Building 1332 Shivaji Nagar, PUNE 411005	32 36 35
T.C. No. 14/1421, University P. O. Palayam, THIRUVANANTHAPURAM 695034	6 21 17

---

*Sales Office is at 5 Chowringhee Approach, P.O. Princep Street, CALCUTTA 700072	27 10 85
†Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007	309 65 28
‡Sales Office is at 'F' Block, Unity Building, Narashimaraja Square, BANGALORE 560002	222 39 71

Printed at Printograph, New Delhi (INDIA).